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(71) Applicant(s):  
**Sanjay Valmikrao Sonanis**  
**18 Rockwood Drive, SKIPTON,**  
**North Yorkshire, BD23 1NF,**  
**United Kingdom**

(72) Inventor(s):  
**Sanjay Valmikrao Sonanis**

(74) Agent and/or Address for Service:  
**Sanjay Valmikrao Sonanis**  
**18 Rockwood Drive, SKIPTON,**  
**North Yorkshire, BD23 1NF,**  
**United Kingdom**

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(56) Documents Cited:  
**EP 1852072 A** **EP 1477120 A**  
**WO 2005/112805 A**

(58) Field of Search:  
INT CL **A61B**  
Other: **WPI & EPODOC**

(54) Abstract Title: **Femoral neck head centering device**

(57) A femoral neck head centering device having at least three interconnected parts. A first part comprises a body 25 with a longitudinal channel therethrough and a pair of diverging arms 28, 29 at one end for holding a femoral neck. A second part 24 is slidable within the longitudinal channel and is securable to the first part by nut 20. A third part 10 has two arms 9, 11, having longitudinal slots 12 in each arm, the arms being in the form of a right-angle. One slot of the third part connects with the second part 24. A guide wire tube 7 passes through the other slot in the third part 10. More than one device can be used to centre the femoral neck head.

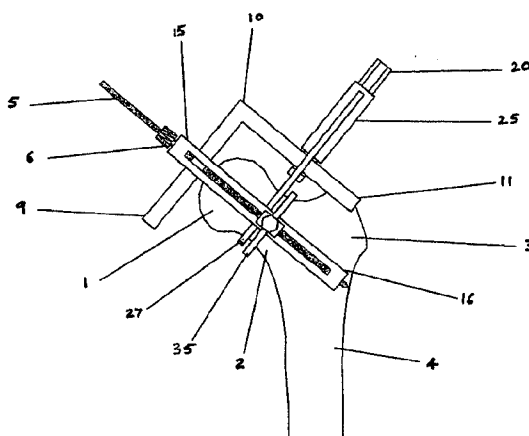


Figure 1.

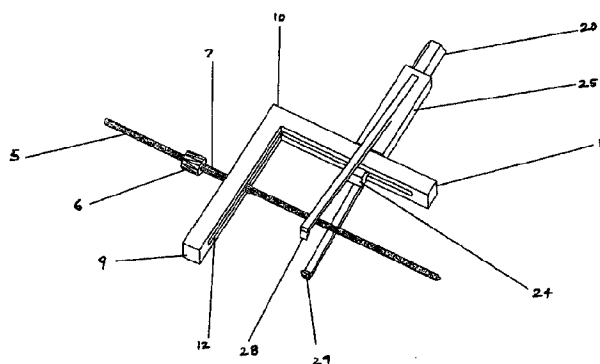


Figure 4.

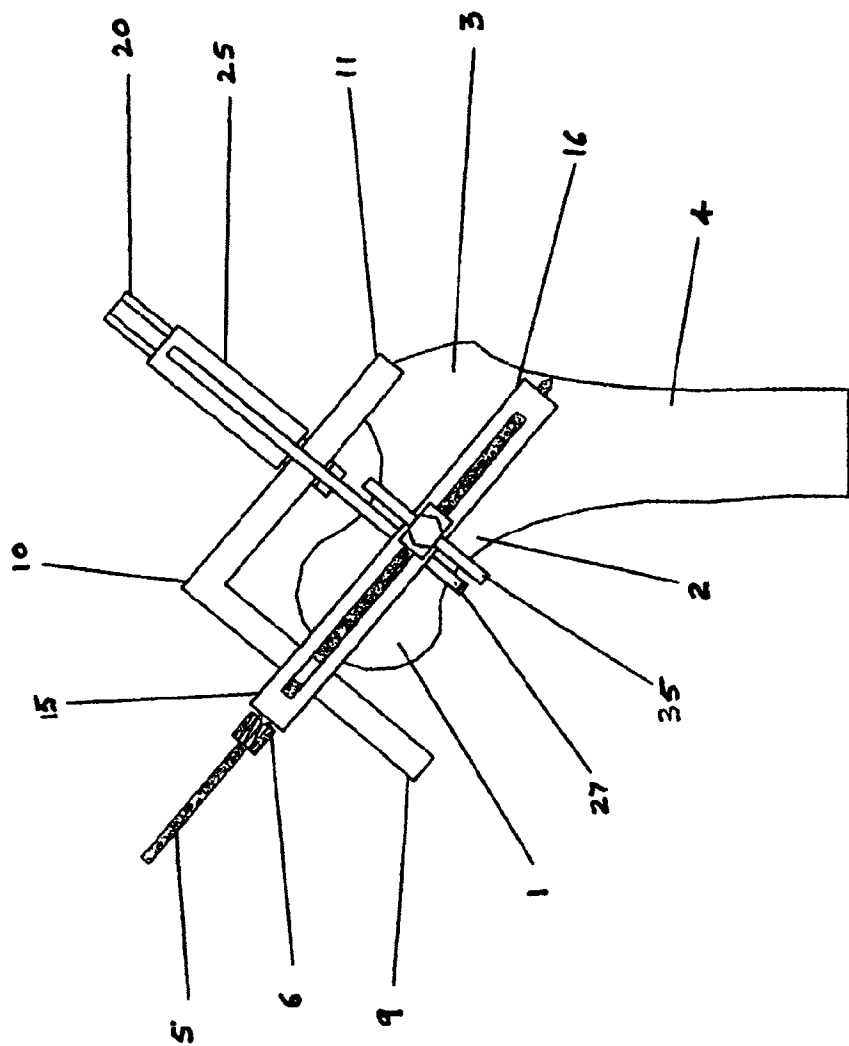


Figure 1.

**Figure 2.**

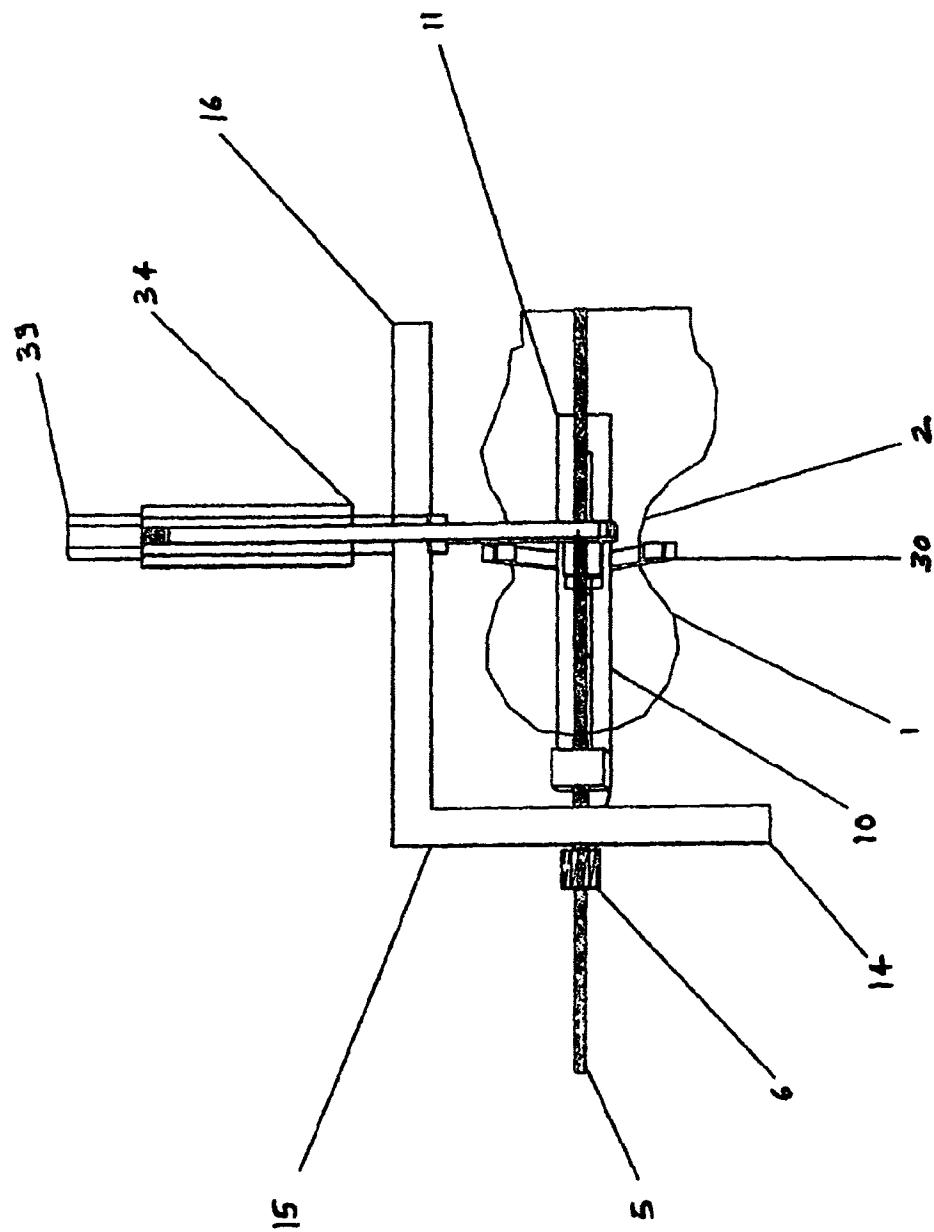


Figure 3.

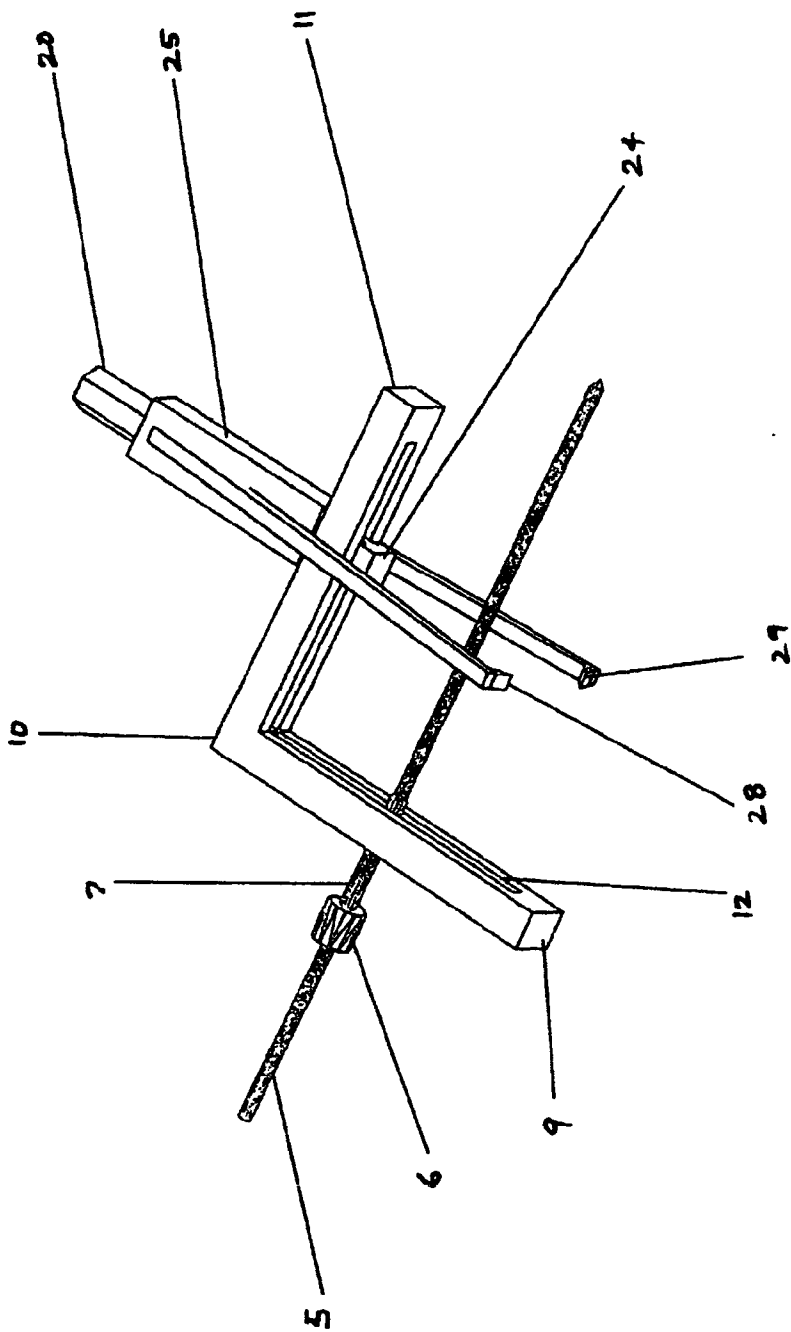


Figure 4.

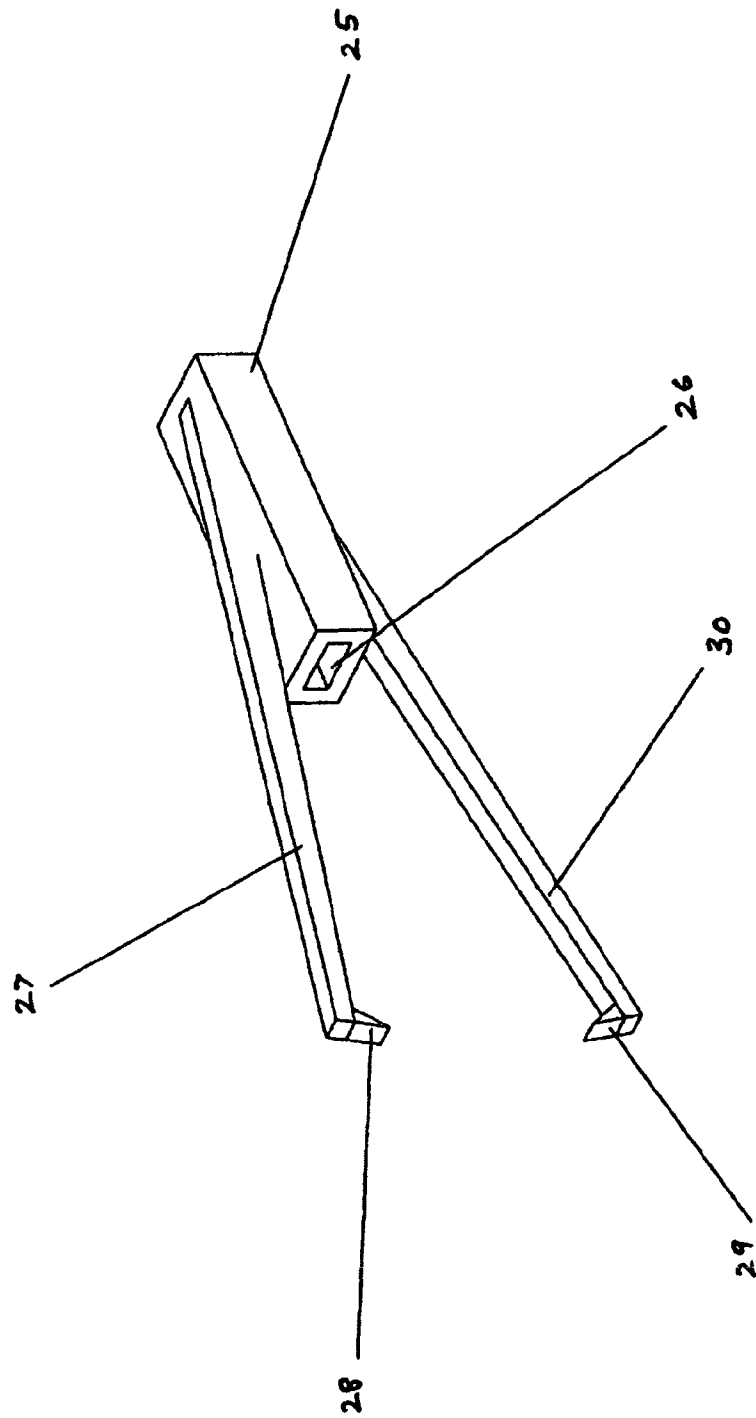


Figure 5.

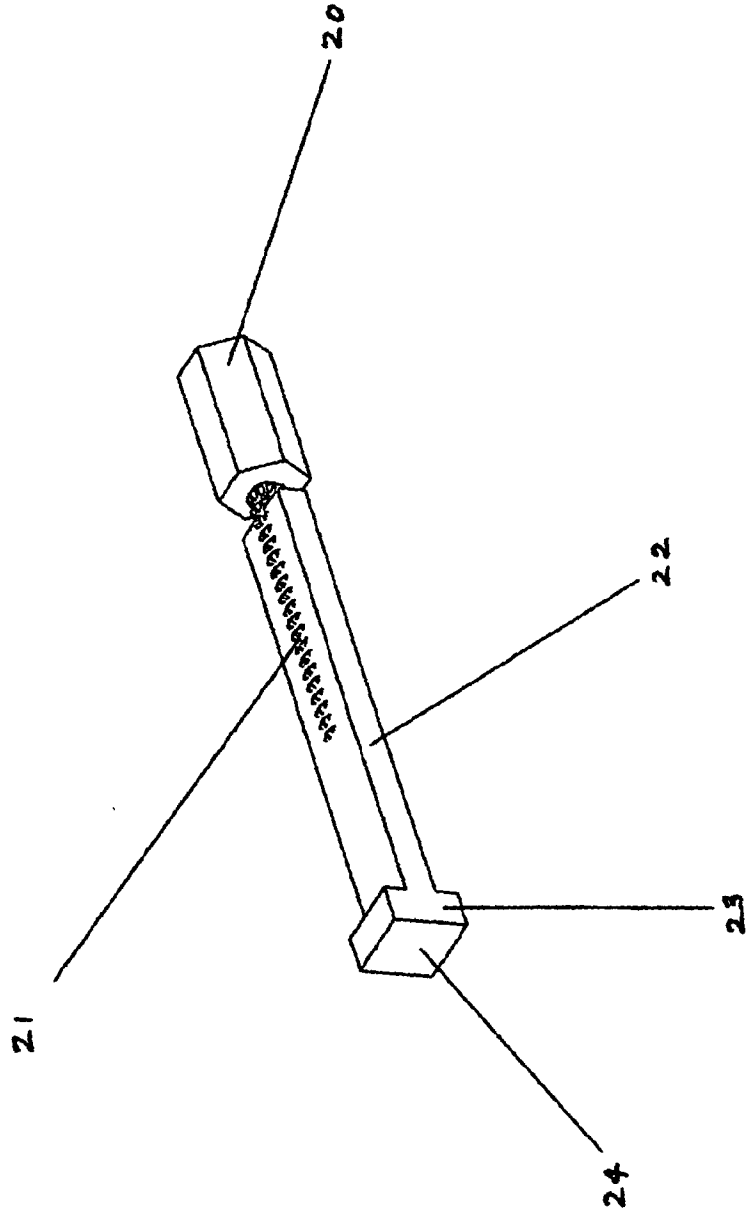


Figure 6.

### **Femoral Head Neck Axis Centering Jig (FHNACJ)**

The present invention relates to a new jig called Femoral Head Neck Axis Centering Jig (FHNACJ) to target the central axis of the neck and head of the femur for correct positioning of the guide wire to place the peg of the new artificial head during hip resurfacing surgery.

The success of hip resurfacing surgery is to place the new metal or ceramic head on the proximal femur in anatomical position so that the joint can function as a good bearing surface with the acetabular socket. Because the head is deformed due to arthritis it is very difficult to find a proper axis of the femoral head and the neck in situ. The new head for hip resurfacing surgery has a shell (cap) with or without a central peg. The head can be anatomically positioned by inserting the central peg of the new head in central axis of the head and neck of femur so as to reduce the abnormal stresses and prevent early failures of the hip resurfacing surgery.

Our new device FHNCAJ will help to find the central axis of the head and neck of femur by identifying two or more central planes and their intersection line for the insertion of the guide pin.

The present invention FHNCAJ consists of a new 'A' shaped jig (Jig A), 'T' shaped jig (Jig T), a locking screw (LS) an 'L' shaped jig (Jig L), a guide wire sleeve (GWS) and a standard guide wire (GW).

#### **Jig A**

It is a fork shaped jig with two limbs 27, 30 attached at one end at the apex and open diverging jaws at the other end with teeth 28, 29 at each end which is placed around the neck of femur 2. At the apex it has a rectangular tunnel 26 to accommodate Jig T 23 and the locking screw 20.

#### **Jig T**

Is a T shaped structure which is rectangular in cross section. The vertical limb of the T 24 glides in the rectangular tunnel 26 of Jig A, and is projected towards the opened jaws bisecting the two limbs of the Jig A into equal half. The vertical limb 22 of Jig T is locked in Jig A on top with a locking screw 20. The 'T' end 23 of the Jig accommodates the slot of Jig L.

#### **Locking Screw (LS)**

It is a screw which has a threaded shaft 21 and a long hexagonal cylindrical head 20. Threaded portion is passed from the apex of the Jig A into the Jig T to hold the Jig T and adjust the length of Jig T. The hexagonal end is used to hand tightened the screw.



### **Jig L**

It is a right angular L shaped jig with longitudinal slot 12 in its both limbs. The distal limb 11, 16 of the slotted Jig L sits on the Jig T and the other bent limb 9, 14 sits on the head of femur 1.

### **Guide wire sleeve (GWS)**

Guide wire sleeve is a cylindrical tube 7 which has broad cylindrical end proximally 6 and a sharp serrated edge distally which sits on the head of the femur 1. GWS is introduced in the common tunnel created by the crossing of two or more proximal limbs of the Jig L (Fig.2) on the femoral head. It guides the insertion of the central guide wire (CGW) 5 in the central axis of the head and neck of the femur.

### **Central Guide wire (CGW)**

Is a standard long guide wire 5 which is placed in the GWS 6 and is drilled in the head and neck of the femur directing it from the head proximally into the neck of the femur laterally and distally. It determines the central axis of the femoral head and neck and guides the other jigs for the further preparation of the head. Additional pins can be used to pass through the slot of the Jig L in to the head and neck of the femur to stabilize it on the bone.

In a hip resurfacing surgery the hip joint is exposed under sterile asepsis and the head and the neck of femur is visualized.

At least two or more 'A' shaped jigs are placed on the femoral neck radially in at least two planes perpendicular to each other. First Jig A1 34 is positioned in front of the femoral neck bracing the vertical thickness of the femoral neck and other second Jig A2 25 is placed from the side bracing the horizontal thickness of the femoral neck.

The distal end 16 of the slotted Jig L1 is placed on the Jig T1 and the proximal angled end 14 of the Jig L1 is positioned on the femoral head and it is held in position with or without a pin driven through the slot into the bone. The slot of Jig L1 on the head of femur identifies one plane of the axis for the guide wire. Similarly the second set of jigs Jig L2 10 and Jig A2 25 is placed from the side perpendicular to the first assembly of jigs, radially to the femoral neck and second central plane of the neck is identified. If necessary more than two pairs of jigs can be placed to increase the accuracy of the guide wire insertion through different planes.

The intersection of the two or more L shaped jigs on the femoral head proximally identifies a common tunnel through which the GWS shaft 7 is inserted. A standard guide wire (CGW) 5 is introduced through the GWS in the exact centre of the head and neck of the femur. The CGW is over reamed to allow insertion of a thick axial central rod (TACR). The head is prepared by mounting the cylindrical and the chamfer reamers on the TACR. After trials the artificial head is implanted on the femur by inserting the peg of the artificial head into the tunnel of the TACR.

- Figure 1.** Front view of the Femoral Head Neck Axis Centering Jig (FHNACJ) placed on femur.
- Figure 2.** Oblique view of the Femoral Head Neck Axis Centering Jig (FHNACJ) showing two sets of jigs in two planes on front and on side.
- Figure 3.** Side view of the Femoral Head Neck Axis Centering Jig (FHNACJ) assembled on femur.
- Figure 4.** Jig A, Jig L with GWS and central guide wire.
- Figure 5.** Jig A.
- Figure 6.** Jig T with screw.

## Claims

1. A Femoral Head Neck Axis Centering Jig (FHNACJ) comprise of various parts; Jig A has two diverging limbs with teeth at its open ends which can embrace the femoral neck and at the narrow end it has a rectangular longitudinal tunnel to accommodate vertical limb of Jig T which is locked in place with a locking screw (LS) on the jig A; the Jig L is a slotted right angular structure which accommodates the T end of the Jig T at its distal end and the proximal bent end of jig L sits on the femoral head and a similar two or more pairs of all these jigs can be placed in different directions radially on the neck and head of the femur to give a common tunnel by crossing of the jig L proximally which allows insertion of guide wire sleeve (GWS) to guide the insertion of the central guide wire (CGW) pin in the centre of the head and neck of the femur.
2. A FHNACJ according to claim 1, includes Jig A which has two flexible narrow limbs with teeth at each end of the limb and a broad apex having a central longitudinal rectangular tunnel to accommodate vertical limb of Jig T.
3. A FHNACJ according to claim 1 and 2 has a Jig T which is rectangular in cross section and the vertical limb of Jig T is inserted in the longitudinal tunnel of Jig A and the T end of the jig is directed towards the neck of the femur to accommodate the Jig L and the other end has female threads to accommodate the male part of the locking screw (LS).
4. A FHNACJ according to any of the above preceding claims has a Jig L which is a right angled jig with a slot through out its length and each limb is a rectangular in cross section and the distal part of the Jig L slot accommodates the Jig T and the proximal part lies on the head of the femur.
5. A FHNACJ as claimed in all the above preceding claims has a LS which is a cylindrical threaded screw with a thick longitudinal hexagonal head and it is passed through the tunnel of Jig A into the female part of the Jig T stabilizing it.
6. A FHNACJ as claimed in all the above preceding claims has a guide wire sleeve (GWS) which is a cylindrical sleeve and its one end is thick and cylindrical and the other end is narrow and has sharp serrated edge to rest on the femoral head.
7. A FHNACJ as claimed in all the above preceding claims has two or more proximal part of the Jigs L limbs crossing over each other on the head of the femur giving a common tunnel in which the guide wire sleeve is inserted which guides the central guide wire into the head of the femur for further preparation.

S.

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**Examiner:** Hayley Yates

**Claims searched:** 1-7

**Date of search:** 14 March 2008

## Patents Act 1977: Search Report under Section 17

### Documents considered to be relevant:

Category	Relevant to claims	Identity of document and passage or figure of particular relevance
A	-	EP 1852072 A Finsbury (Development) Limited; see figures 2 and 4
A	-	WO 2005/112805 A Depu International; see figures 1 and 4b
A	-	EP 1477120 A Corin Limited; see figure 12

### Categories:

X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art.
Y	Document indicating lack of inventive step if combined with one or more other documents of same category.	P	Document published on or after the declared priority date but before the filing date of this invention
&	Member of the same patent family	E	Patent document published on or after, but with priority date earlier than, the filing date of this application.

### Field of Search:

Search of GB, EP, WO & US patent documents classified in the following areas of the UKC<sup>X</sup>:

Worldwide search of patent documents classified in the following areas of the IPC

The following online and other databases have been used in the preparation of this search report

### International Classification:

Subclass	Subgroup	Valid From
A61B	0017/17	01/01/2006